**Date: 20/2/2012**

Acid and Base Indicator Prac.

**Partners:**

**Introduction:**

Acids and bases are found everywhere in life. There are substances called indicators that will change colour to indicate whether a chemical is acidic, basic or neutral. Indicators can be very specific for the concentration of an acid or base or they may change over a variety of concentrations.

**Aim:**

To see how indicators react in various acids and bases.

**Hypothesis:**

If an indicator is added to a chemical, then it may change colour.

**Materials:**

Indicators

Phenolphthalein

Methyl Red

Universal Indicator

Blue Litmus Paper

Red Litmus Paper

Methyl Orange

Chemicals for testing

Vinegar

Distilled Water

Ammonia

Equipment

Test tubes and rack

Droppers

**Method:**

1. Add 5 drops of vinegar to 5 test tubes
2. Add 5 drops of distilled water to 5 test tubes
3. Add 5 drops of ammonia to 5 test tubes
4. Add 1-2 drops of phenolphthalein to one vinegar test tube and record your observations.
5. Add 1-2 drops of the other indicators to the remaining vinegar tubes and record observations.
6. Dip the litmus papers into the vinegar and record your observations
7. Repeat steps 4-6 for the distilled water and ammonia test tubes

**Variables**

Independent Variable: The indicators that were added

Dependent Variable: The resulting colour of the indicator when it is added to tested chemical

Constant: The amount of testing chemical, the amount of drops of indicator added.

**Results**

|  |  |  |  |
| --- | --- | --- | --- |
| Indicator | Vinegar | Distilled Water | Ammonia |
| Phenolphthalein | Clear | Clear | Pink |
| Methyl Red | Dark Red | Orange | Orange |
| Universal Indicator | Pink | Green | Blue |
| Red Litmus Paper | Red | Red | Blue |
| Blue Litmus Paper | Red | Blue | Blue |
| Methyl Orange | Red | Orange | Orange |

**Discussion**

1. *Which of the indicators changed only with acid?*

The indicators that changed only with the acid (vinegar) were methyl red, red litmus paper and methyl orange.

1. *Which of the indicators changed only with a base?*

The indicators that changed only with the base (ammonia) were phenolphthalein and blue litmus paper.

1. *Which indicators also changed with the distilled water?*

The only indicator that changed with distilled water was universal indicator.

1. *What does this mean if phenolphthalein is used as an indicator and does not change colour?*

If the phenolphthalein does not change colour it means that the chemical is either acid or neutral.

1. *Were there any indicators that changed in both an acid and base?*

The universal indicator changed in both an acid and a base.

1. *Where might it be important to use acid and base indicators in real life (you may need to google this)?*

Important uses of acid and base indicators include checking pool pH. If the pool is too acidic, it will irritate your eyes. If it is too basic then it may allow bacterial growth.

1. *Where there changes that you would suggest to improve the experiment?*

Changes could include measuring the amount of acid or base that is used is to make sure the volume is the same. Another improvement would be to ensure that the test tubes are labelled to avoid mixing up the chemicals being tested. A third improvement would be when using the litmus paper, use a pipette to drop the chemicals being tested onto the paper. This is because it is difficult to get the paper into the test tube to test it.

1. *Check your results with expected answers (*[*http://chemistry.about.com/od/acidsbases/a/Acid-Base-Indicators.htm*](http://chemistry.about.com/od/acidsbases/a/Acid-Base-Indicators.htm)*) . Where there any unexpected results?*

Compared to the table on the link, all of the results were expected.

**Conclusion**

When an indicator is added to a chemical, its colour will change according to whether that chemical is an acid or a base. The results support the hypothesis.